FluxReader Advertisement and Updates

Gareth Kafka

Harvard University

10/22/14

Outline

- Framework Overview
- Documentation
- Recent Updates
- Future Updates

Framework Overview

- FluxReader (FR) is a framework designed to read dk2nu files
- It is run by writing and running compiled ROOT macros
- The purpose of the framework is to generate a lot of similar plots quickly, for example:
  - Energy histograms for each neutrino flavor
  - p_T vs p_z plots for neutrinos from each parent species
- POT information is saved for the user
- FR has its own Wiki and mailing list, FLUXREADER
- FR users should join the mailing list to automatically find out about updates!

The User Can Configure:

- Neutrino flavors, parent species, applied cross sections, detectors
- Histogram type, binning, dimension
- Variable to fill, weights/cuts to apply, external weight logic
- Number of times to smear a neutrino ray through each detector

Documentation

- First and foremost: the FluxReader Wiki
  - https://cdcvs.fnal.gov/redmine/projects/fluxreader/wiki
- FR has Six demo scripts, the first showing the bare essentials to run FluxReader, and subsequent scripts build in complexity
  - The scripts are labeled as Demo#_<Tutorial>.C, where # gives the order, and <Tutorial> describes what the script will demonstrate
  - These scripts showcase nearly every feature of the framework!
- FR has a template script, FluxReaderTemplate.C
- Internal code is thoroughly commented
- A Tech Note is on the Wiki

Recent Updates

- POT counting has been fixed
- FR outputs the names of each file to screen
- Accessing the neutrino – electron scattering cross section is handled properly, based on neutrino flavor
- Cross section plots now have a y axis unit label
- Detector coordinates are dynamically loaded from Dk2Nu
- New default detectors: Minerva, (Mini/Micro/Sci)BooNE
- Handle to turn on/off some warning outputs

Future Updates

- Automatic (or function for) rescaling of histograms with default weights to units that ‘make sense’
- Updated coordinate transformations (hopefully to come directly from Dk2Nu!)
- I have an idea for a behind the scene speed boost
- More user control of Detector class

Back Up Slides

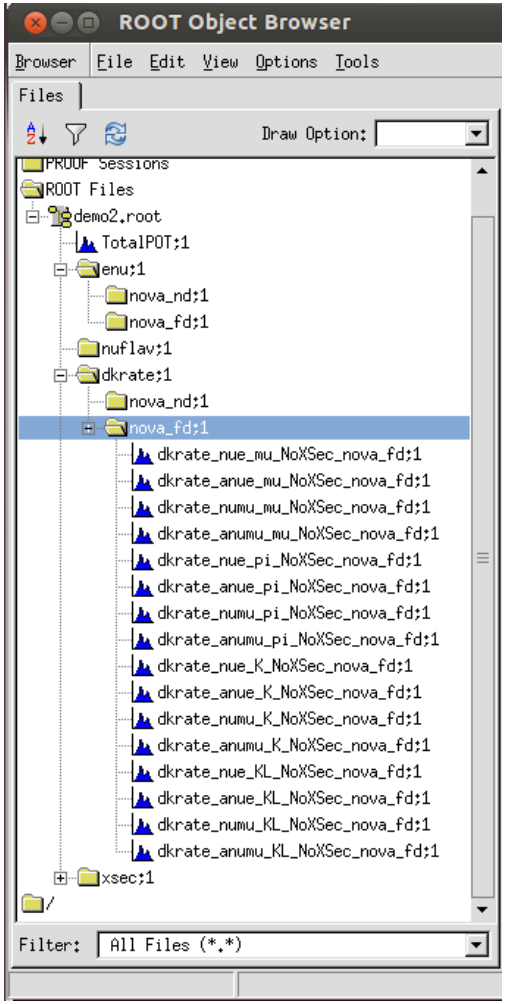
Access

- FluxReader exists in its own repository, independent of any single experiment
- The FluxReader Wiki has details on checking out and building the framework
- Users can check out the code and make local edits, but these changes cannot be committed
- Please email for Gareth (gkafka@fnal.gov) for requests

Input/Output

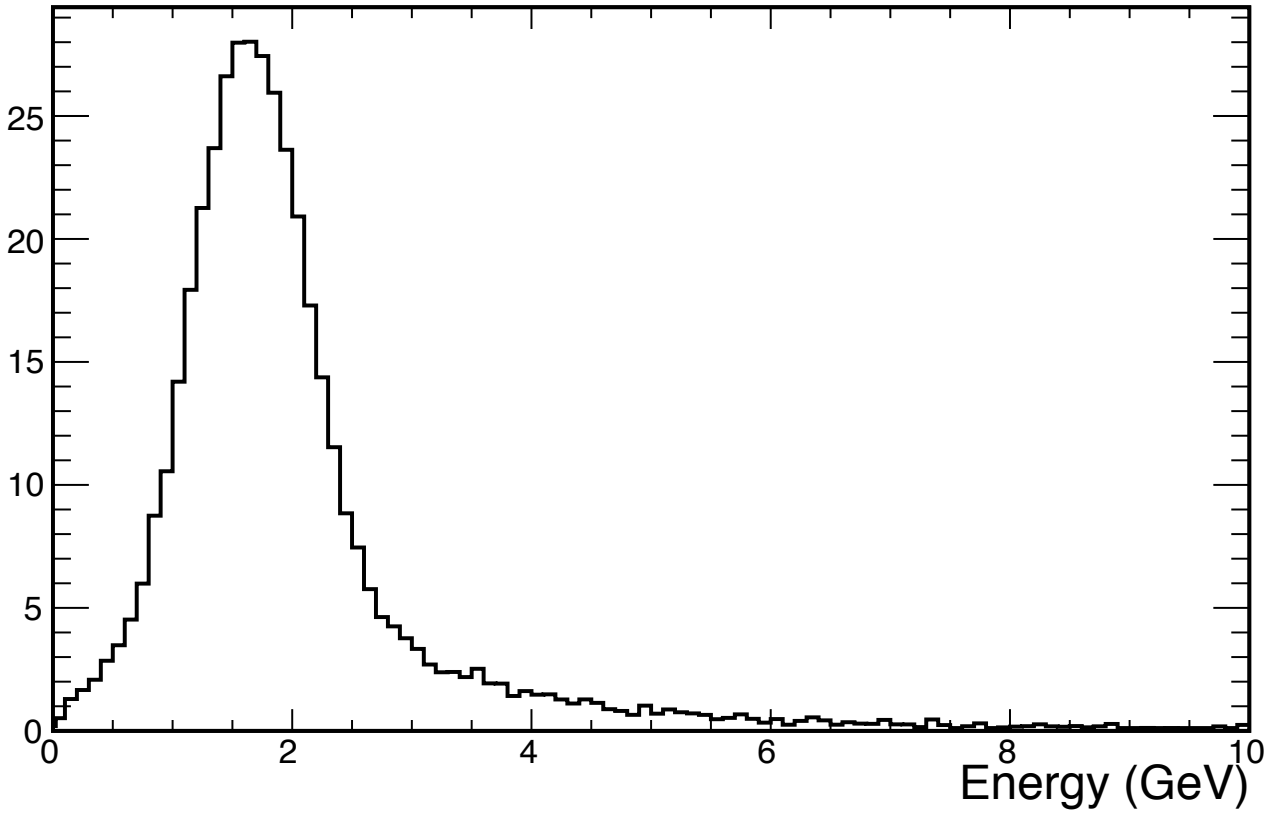
- FluxReader takes Dk2Nu files as input, and outputs a ROOT file to a user specified location

- The file is organized based on the type of Spectra produced, then further subdivided by plots at a specific detector



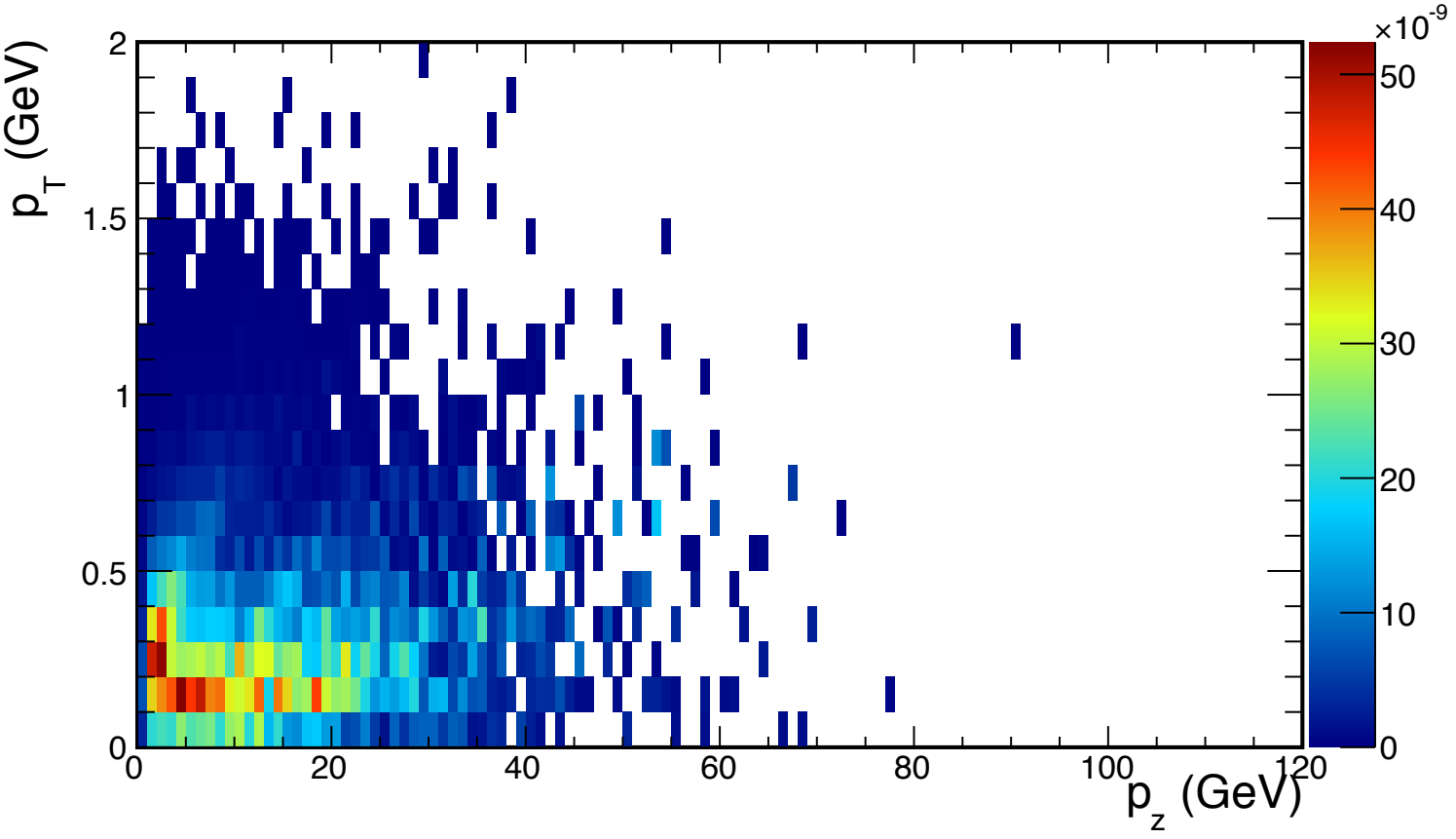
Usage Examples

- Neutrino Energy Spectra
- At NOνA ND, ν_μ, from pions, no applied cross section



Usage Examples

- Parent p_T vs p_z
- At NOνA FD, anti-ν_μ, from kaons, no applied cross section



Usage Examples

- Beam matrix
- All ν's, from pions, no applied cross section